CITY OF LAVA HOT SPRINGS (PWS 6030030)
SOURCE WATER ASSESSMENT FINAL REPORT
PART II: ASSESSMENT OF THE SPRINGS

February 18, 2003

State of Idaho
Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment areas and sensitivity factors associated with the springs and the aquifer characteristics.

This report, *Source Water Assessment for City of Lava Hot Springs, Idaho*, describes the public water system (PWS), the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The City of Lava Hot Springs PWS (# 6030030) is a community drinking water system located in Bannock County that includes eleven springs and two wells. The wells were assessed in a separate report and will not be included in this report.

The springs are located east of the City of Lava Hot Springs, off Highway 30 near Fish Creek. Most of the springs are located within the same general location. Spring # 4 is approximately one-half mile east of the other springs. The springs were developed in 1987 as a drinking water source for the City. Water from the springs is disinfected with liquid chlorine prior to entering the 410,000-gallon, buried, concrete storage reservoir located on a hillside south of town. The springs are the primary source of drinking water for the City of Lava Hot Springs and provide a maximum of 340 gallons per minute (gpm) of water. However, presently the system does not provide adequate water to serve the City during high demand periods. During the summer months, the City must impose water restrictions due to low pressure. The system currently serves 420 persons through 220 connections.

Because the springs are located within the same general area, they share the same delineation. The potential contaminant sources within the delineation capture zone of the springs are Fish Creek, Highway 30, septic systems, and a gravel road that accesses the spring area. If an accidental spill occurred in any of these corridors or areas, inorganic chemical (IOC) contaminants, volatile organic chemical (VOC) contaminants, synthetic organic chemical (SOC) contaminants, or microbial contaminants could be added to the aquifer systems.

Final susceptibility scores for the springs are derived from heavily weighting potential contaminant inventory/land use scores and adding them to the spring system construction score. Therefore, a low rating in one category coupled with a higher rating in the other category results in a final rating of low, moderate, or high susceptibility. Potential contaminants are divided into four categories: IOCs (i.e., nitrates, arsenic), VOCs (i.e., petroleum products), SOCs (i.e., pesticides), and microbial contaminants (i.e., bacteria). As a spring can be subject to various contamination settings, separate scores are given for each type of contaminant.

For the assessment, a review of laboratory tests was conducted using the State Drinking Water Information System (SDWIS). The last detection of total coliform bacteria in the distribution system was recorded in April 2001. However, no coliform bacteria have been detected at the springs. No SOCs or VOCs have been detected in the water system. The IOCs fluoride, cyanide, lead, barium, and nitrate have been detected in the spring water but at concentrations below the maximum contaminant level (MCL) for each chemical, as established by the EPA.

To determine if the springs of the City of Lava Hot Springs are influenced by surface water, two Microscopic Particulate Analyses (MPAs) were completed. The first test was completed during a high water table period (March 1995) and the second test was conducted during a low water table period (November 1995). The relative risk rating for the samples was zero, indicating that the water from the springs is not influenced by surface water and is considered ground water.

In terms of total susceptibility, Springs # 1-3 and Springs # 6-11 rated moderate for IOCs, VOCs, SOCs, and microbial contaminants. Springs # 4 and # 5 rated high for all potential contaminant categories due to Fish Creek running within 100 feet of the collection areas. If Fish Creek were diverted to an area greater than 100 feet away from the springs, the susceptibility scores for Springs # 4 and # 5 will be reduced to moderate. System construction rated moderate for all of the springs and potential contaminant land use scores were moderate for IOCs, VOCs, SOCs, and microbial contaminants for all of the springs. The predominant agricultural land use within the area surrounding the springs and the potential contaminant sources within the delineation area contributed to the susceptibility of the springs to contamination.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the City of Lava Hot Springs, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system’s components and its capacity). The system should continue their efforts to keep the distribution system free of microbial contamination and to concentrate on further protecting the springs from surface water contamination potentially associated with Fish Creek. As land uses within most of the source water assessment areas are outside the direct jurisdiction of the City of Lava Hot Springs, collaboration and partnerships with state and local agencies and industry groups should be established and are critical to success. Educating city employees and the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods and the importance of water conservation. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of

Agriculture, the Portneuf Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR CITY OF LAVA HOT SPRINGS, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is included.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the Environmental Protection Agency (EPA) to assess over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment areas, sensitivity factors associated with the springs, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water supply system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the public water system (PWS).**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The City of Lava Hot Springs PWS (# 6030030) is a community drinking water system located in Bannock County that includes eleven springs and two wells. The wells were assessed in a separate report and will not be included in this report.

The springs are located east of the City of Lava Hot Springs, off Highway 30 near Fish Creek. Most of the springs are located within the same general location. Spring # 4 is approximately one-half mile east of the other springs. The springs were developed in 1987 as a drinking water source for the City. Water from the springs is disinfected with liquid chlorine prior to entering the 410,000-gallon, buried, concrete storage reservoir located on a hillside south of town. The springs are the primary source of drinking water for the City of Lava Hot Springs and provide a maximum of 340 gallons per minute (gpm) of water. However, presently the system does not provide adequate water to serve the City during high demand periods. During the summer months, the City must impose water restrictions due to low pressure. Currently, the system serves 420 persons through 220 connections (see Figure 1).

The last detection of total coliform bacteria in the distribution system was recorded in April 2001. However, no coliform bacteria have been detected at the springs. No synthetic organic chemicals (SOCs) or volatile organic chemicals (VOCs) have been detected in the water system. The inorganic chemicals (IOCs) fluoride, cyanide, lead, barium, and nitrate have been detected in the spring water but at concentrations below the MCL for each chemical, as established by the EPA.

To determine if the springs of the City of Lava Hot Springs are influenced by surface water, two Microscopic Particulate Analyses (MPAs) were completed. The first test was completed during a high water table period (March 1995) and the second test was conducted during a low water table period (November 1995). The relative risk rating for the samples was zero, indicating that the water from the springs is not influenced by surface water and is considered ground water.

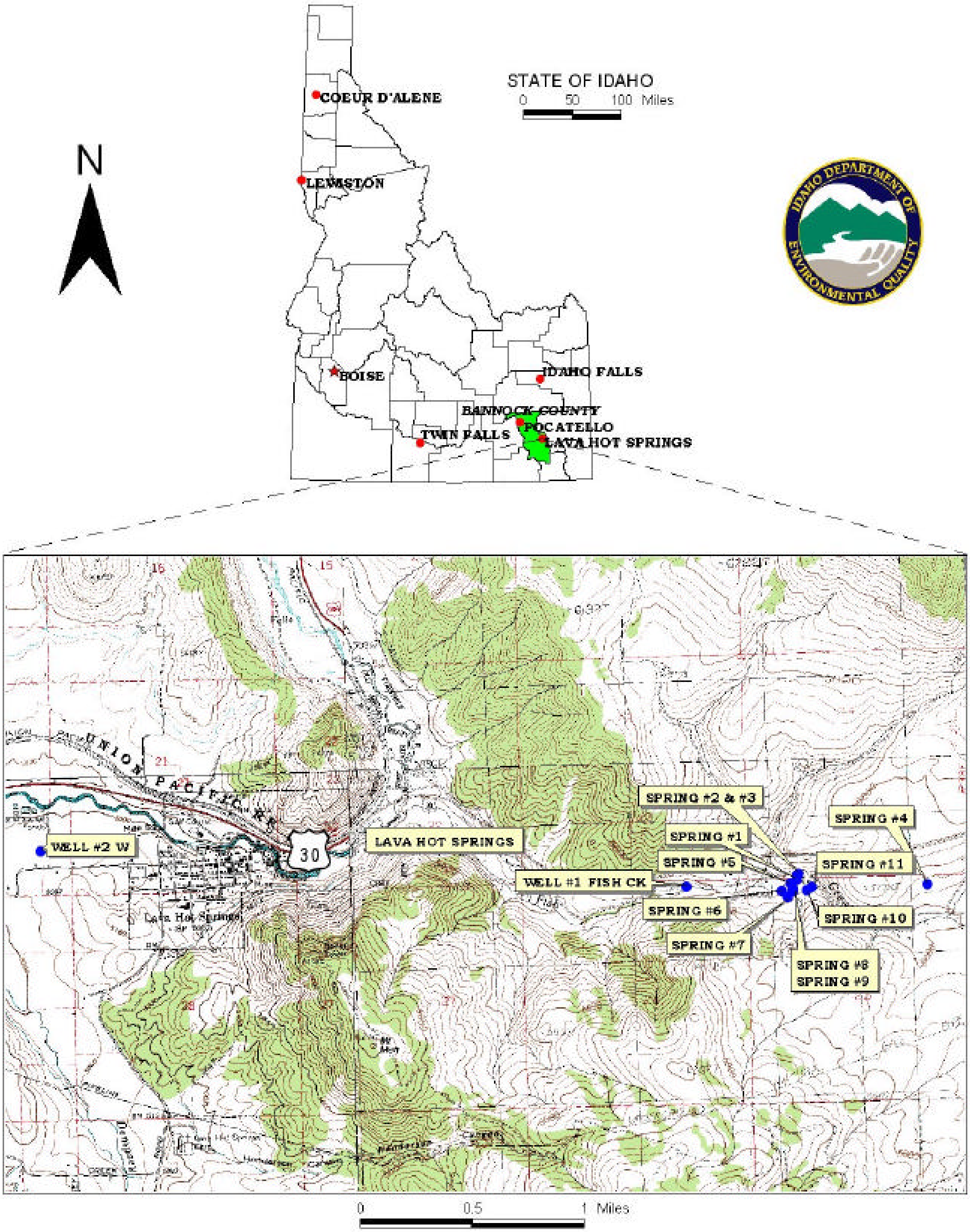
Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a drinking water source that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a flowing spring) for water in the aquifer. DEQ defined the public water system's zone of contribution. DEQ used a topographic method approved by the Source Water Assessment Plan (DEQ, 1999) in determining the TOT zone for water associated with the Portneuf Valley-Gem Valley hydrologic province in the vicinity of the City of Lava Hot Springs. The model used site-specific data, assimilated by DEQ from a variety of sources including operator records and hydrogeologic reports. A summary of the hydrogeologic information is provided below.

Hydrogeologic Conceptual Model

The Portneuf Valley – Gem Valley hydrologic province occupies approximately 211 square miles east of Pocatello, Idaho. The Basin and Range physiographic province is north to south trending and is bounded by the Wasatch, Chesterfield, and Portneuf mountain ranges to the southeast, east, and west, respectively. Average annual precipitation ranges from less than 15 inches on the valley floor near Bancroft to 35 inches in the mountains (Norvitch and Larson, 1970, p. 8).

FIGURE 1. Geographic Location of the City of Lava Hot Springs



The Portneuf and Gem valley floors consist of Quaternary alluvium, Quaternary olivine basalt flows, and sedimentary rocks of the Tertiary Salt Lake Formation (Norvitch and Larson, 1970, Figures 5 and 6, and Norton, 1981, p. 9). The basalt flows overlie and interfinger sediment deposits in the main portion of the province (Dion, 1969, p. 16). The basalts were extruded from cones and fissures near Alexander and between Niter and the Grace power plant and the Blackfoot Lava Field (Norton, 1981, p. 10). A surface geologic map of the Portneuf River Basin (Norvitch and Larson, 1970, p. 14) indicates that the western arm of the province is composed primarily of Quaternary alluvial deposits and Tertiary sedimentary rock outcrops. Ground water occurs in virtually every geologic unit; however, the principal aquifer is basalt. A broad northwest trending mound of water forms a ground water divide in the basalt aquifer at the southern margin of the province (Dion, 1969, p. 19 and Figure 5, and Norton, 1981, Figure 5). Water north of the divide flows to the Snake River, and water south of the divide flows to the Bear River drainage that empties into the Great Salt Lake in Utah. Available water table maps indicate that the general ground water flow direction in the study area is to the Portneuf River, a tributary of the Snake River (Norvitch and Larson, 1970, p. 17, and Norton, 1981, p.15).

The primary source of ground water recharge to the basalt aquifer is precipitation on the valley floor and the surrounding mountains. Other sources are underflow from the Soda Springs hydrologic province through the gap at Soda Point and at Tenmile Pass, percolation from irrigation, canal leakage, and stream losses (Norton, 1981, p. 11, and Dion, 1974, p.19).

The primary ground water discharge mechanisms are evapotranspiration, discharge through hundreds of springs and seeps, pumpage from wells, and underflow through the Portneuf Gap (Norton, 1981, p. 11; Norvitch and Larson, 1970, p 18; and Dion, 1969, p. 19).

The basalt aquifer has highly variable hydraulic properties. Specific capacities calculated from data obtained from driller’s logs range from 2 to 3,000 gal/min/ft of drawdown (Norvitch and Larson, 1970, pp. 24-30). Hydraulic conductivities calculated from the above specific capacity data range from 11 to 6,000 ft/day, assuming an effective storage coefficient of 0.005 and a pumping time of 4 hours. A multiple-well pump test conducted near the city of Bancroft resulted in an estimated transmissivity of 400,000 ft2/day (3 million gal/day/ft; Norvitch and Larson, 1970, p. 24).

There is little usable information available on the direction of ground water flow in the alluvial and sedimentary rock aquifers. Flow in the alluvial aquifer located in the western arm of the province can be assumed to follow the Portneuf River and have roughly the same gradient as the surface topography. Making the same assumptions for the sedimentary rock aquifer is not reasonable. The folded and fractured sedimentary rocks that underlie the Portneuf and Gem valleys also make up the bulk of the surrounding mountains. Water moving through these formations tends to follow bedding planes that pass under mountain ridges. Consequently, the flow may cross topographic divides and discharge to a valley different from that of the recharge area (Ralston et al., 1979, pp. 128-129).

Springs and Spring Delineation Method

A spring is defined as a concentrated discharge of ground water appearing at the ground surface as flowing water (Todd, 1980). The discharge of a spring depends on the hydraulic conductivity of the aquifer, the area of contributing recharge to the aquifer, and the rate of aquifer recharge. PWS springs are generally perennial. Large seasonal changes in the discharge rates are an indication of a relatively shallow flow system. While most springs fluctuate in their rate of discharge, springs in volcanic rock (e.g., basalt) are noted for their nearly constant discharge (Todd, 1980).

Delineation of the drinking water protection area for a spring involves special consideration. Hydrogeologic setting is foremost among the factors that control the shape and extent of the capture zone. A spring resulting from the presence of a high permeability fracture extending to great depth will have a much different capture zone than a depression spring formed where the ground surface intersects the water table in a unconsolidated aquifer.

The topographic (IDEQ, 1997, p. 4-9) method was used to delineate hydraulic capture zones for the springs of the City of Lava Hot Springs. Method selection was based on an assessment of hydrogeologic uncertainty as affected by the quantity and quality of available information. A more detailed description of the delineation approaches is provided in the following section.

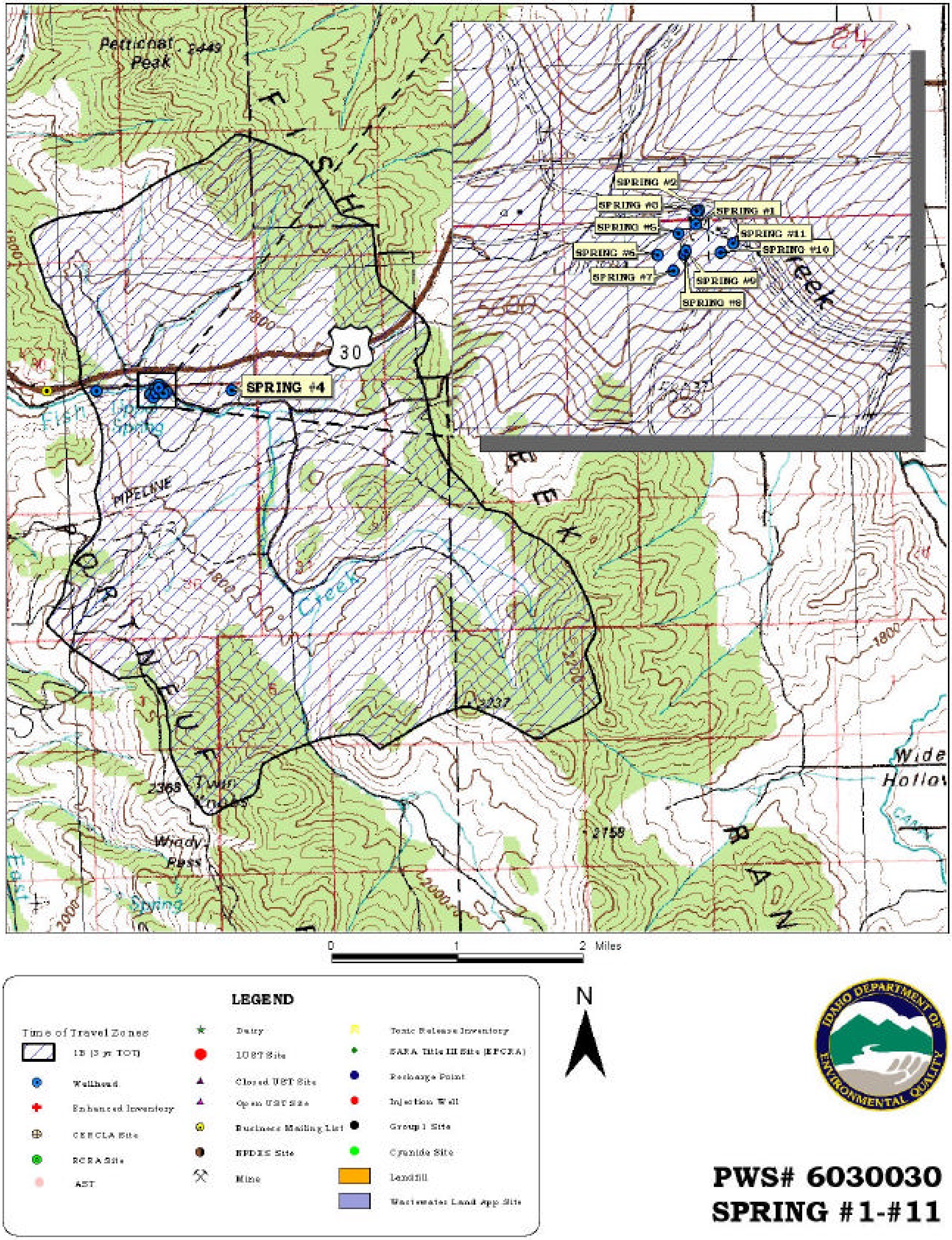
Topographic Method

Topographic maps (1:24,000 scale) were examined to identify the topographic divides bounding the drainage basins surrounding the springs. The assumption was made that ground water divides, which represent hydrologic boundaries to ground water flow, are coincident with the topographic divides. Perennial streams or other surface water bodies that may imply the presence of hydrologic boundaries were identified.

Surface geologic maps were also used to identify low-permeability lithologic units that may form ground water flow boundaries and to infer the extent of lithologic units that provide water to springs. The reasonableness of a topographic delineation was checked by calculating the amount of recharge needed to produce the average reported spring discharge. The required recharge was then compared to the average yearly precipitation in the area surrounding the spring.

The delineated source water assessment area for the springs of the City of Lava Hot Springs can be described as a large polygonal-shaped area that captures Highway 30, most of the lower Fish Creek drainage, and extends up the Portneuf Range. It stretches from just below Petticoat Peak north of Highway 30 to Twin Knobs south of Highway 30 and is approximately three miles wide in the east-west direction. The topographic delineation only includes a 3-year TOT zone (see Figure 2). The actual data used in determining the source water assessment delineation area is available from DEQ upon request.

FIGURE 2. City of Lava Hot Springs Delineation Map and Potential Contaminant Source Locations



PWS# 6030030
SPRING #1-#11

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ and reviews of available databases including Geographic Information System (GIS) maps identified Fish Creek, Highway 30, septic systems, and a gravel road as potential contaminant sources within the delineated area (Table 1).

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply source.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in November 2000 and December 2002. The first phase involved identifying and documenting potential contaminant sources within the City of Lava Hot Springs source water assessment area through the use of sanitary surveys, computer databases and GIS maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the delineated areas. Maps with the spring locations, delineated area, and potential contaminant sources are provided with this report (see Figure 2, Table 1). At the time of the enhanced inventory, the City of Lava Hot Springs operator, Tony Hobson, did not identify any other potential sources of contamination.

Table 1. City of Lava Hot Springs Springs, Potential Contaminant Inventory

Source Description	TOT Zone (years)	Source of Information	Potential Contaminants[1]
Highway 30	0-3	GIS Map	IOC, VOC, SOC, Microbials
Fish Creek	0-3	GIS Map	IOC, VOC, SOC, Microbials
Gravel Road	0-3	GIS Map	IOC, VOC, SOC, Microbials
Septic System	0-3	GWUDI Field Survey	IOC, Microbials

[1] **IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical**

Section 3. Susceptibility Analyses

The springs' susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: construction, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for the springs is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Spring Construction

Spring construction scores are determined by evaluating whether the spring has been constructed according to Idaho Code (IDAPA 58.01.08.04) and if the spring's water is exposed to any potential contaminants from the time it exits the bedrock to when it enters the distribution system. If the spring's intake structure, infiltration gallery, and housing are located and constructed in such a manner as to be permanent and protect it from all potential contaminants, is contained within a fenced area of at least 100 feet in radius, and is protected from all surface water by diversions, berms, etc., then Idaho Code is being met and the score will be lower. If the spring's water comes in contact with the open atmosphere before it enters the distribution system, it receives a higher score. Likewise, if the spring's water is piped directly from the bedrock to the distribution system or is collected in a protected spring box without any contact to potential surface-related contaminants, the score is lower.

The system construction of the each of the springs rated moderately vulnerable to contamination. The springs are located at the canyon floor of Fish Creek Canyon. According to the 2001 sanitary survey (conducted by DEQ), water from the springs is collected through buried perforated PVC pipe and flows to collection boxes. Grass is growing on the soil that covers the PVC pipe. The collection areas are fenced off from livestock and the City of Lava Hot Springs owns the land where the springs are located. According to a 1994 field survey, all of the spring collection boxes have overlapping, tight, and locked covers and diversion ditches divert surface runoff from the spring collection areas. However, the overflow pipes are not screened and the springs are located near Fish Creek and some private septic systems, presenting possible sources of contamination to the water.

Potential Contaminant Source and Land Use

The springs rated moderate for IOCs (i.e., nitrates, arsenic), VOCs (i.e., petroleum products), SOCs (i.e., pesticides), and microbial contaminants (i.e., bacteria). The land use within the area of the springs is classified as undetermined agriculture. The potential contaminant sources existing within the delineation of the springs are Fish Creek and some septic systems near the springs, Highway 30 north of the springs, and a gravel road that accesses the area of the springs.

Final Susceptibility Ranking

A detection above a drinking water standard MCL, a repeated detection of bacteria at the source, or any detection of a VOC or SOC will automatically give a high susceptibility rating to a spring despite the land use of the area, because a pathway for contamination already exists. Additionally, potential contaminant sources within 100 feet of a spring and within 50 feet of a wellhead will automatically lead to a high susceptibility rating. In this case, the 1994 field survey indicates that Fish Creek runs within 100 feet of Springs # 4 and # 5, resulting in automatic high susceptibility ratings to all potential contaminant categories (Table 2, below). Having multiple potential contaminant sources in the 0- to 3-year time of travel zone (Zone 1B) contribute greatly to the overall ranking.

Table 2. Summary of City of Lava Hot Springs Susceptibility Evaluation

Drinking Water Source	**Susceptibility Scores**[1]								
	Potential Contaminant Inventory and Land Use				**System Construction**	**Final Susceptibility Ranking**			
	IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Spring #1	M	M	M	M	M	M	M	M	M
Spring #2	M	M	M	M	M	M	M	M	M
Spring #3	M	M	M	M	M	M	M	M	M
Spring #4	M	M	M	M	M	H*	H*	H*	H*
Spring #5	M	M	M	M	M	H*	H*	H*	H*
Spring #6	M	M	M	M	M	M	M	M	M
Spring #7	M	M	M	M	M	M	M	M	M
Spring #8	M	M	M	M	M	M	M	M	M
Spring #9	M	M	M	M	M	M	M	M	M
Spring #10	M	M	M	M	M	M	M	M	M
Spring #11	M	M	M	M	M	M	M	M	M

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
H* = Automatic high score due Fish Creek that runs within 100 feet of Springs # 4 and # 5

Susceptibility Summary

In terms of total susceptibility, Springs # 1-3 and Springs # 6- 11 rated moderate for IOCs, VOCs, SOCs, and microbial contaminants. Springs # 4 and # 5 rated high for all potential contaminant categories due to Fish Creek running within 100 feet of the collection areas. If Fish Creek were diverted to an area greater than 100 feet away from the springs, the susceptibility scores for Springs #4 and #5 will be reduced to moderate. System construction rated moderate for all of the springs and potential contaminant land use scores were moderate for IOCs, VOCs, SOCs, and microbial contaminants for the springs. The predominant agricultural land use within the area surrounding the springs and the potential contaminant sources within the delineation area contributed to the susceptibility of the springs to contamination.

The last detection of total coliform bacteria in the distribution system was recorded in April 2001. However, no coliform bacteria have been detected at the springs. No SOCs or VOCs have been detected in the water system. The IOCs fluoride, cyanide, lead, barium, and nitrate have been detected in the spring water but at concentrations below the MCL for each chemical, as established by the EPA.

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed source water protection program will incorporate many strategies. For the City of Lava Hot Springs, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. The system should continue their efforts to keep the distribution system free of microbial contamination and to concentrate on further protecting the springs from surface water contamination potentially associated with Fish Creek and the septic systems. As land uses within most of the source water assessment areas are outside the direct jurisdiction of the City of Lava Hot Springs, collaboration and partnerships with state and local agencies and industry groups should be established and are critical to success. Educating city employees and the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods and the importance of water conservation. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Portneuf County Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Pocatello Regional DEQ Office (208) 236-6160

State DEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper (mlharper@idahoruralwater.com), Idaho Rural Water Association, at (208) 343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLA – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

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Attachment A

City of Lava Hot Springs
Susceptibility Analysis Worksheets

Susceptibility Analysis Formulas

Formula for Spring Sources

The final spring scores for the susceptibility analysis were determined using the following formulas:

1. VOC/SOC/IOC Final Score = (Potential Contaminant/Land Use x 0.818) + System Construction

2. Microbial Final Score = (Potential Contaminant/Land Use x 1.125) + System Construction

Final Susceptibility Scoring:

0 - 7	Low Susceptibility
8 - 15	Moderate Susceptibility
≥ 16	High Susceptibility

Spring Water Susceptibility Report — Public Water System Name: CITY OF LAVA HOT SPRINGS — Spring #1
Public Water System Number 6030030 — 1/2/03 11:26:07 AM

1. System Construction

		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source? Yes=spring developed to collect water from beneath the ground; lower score No=water collected after it contacts the atmosphere or unknown; higher score	YES	0
Total System Construction Score		1

2. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1

Potential Contaminant / Land Use - ZONE 1B

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant sources present (Number of Sources)	YES	4	3	3	4
(Score = # Sources X 2) 8 Points Maximum		8	6	6	8
Sources of Class II or III leacheable contaminants or	YES	8	3	3	
4 Points Maximum		4	3	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Non-Irrigated Agricultural	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	11	11	10
Cumulative Potential Contaminant / Land Use Score		15	12	12	11

	IOC	VOC	SOC	Microbial
3. Final Susceptibility Source Score	13	11	11	13
4. Final Spring Ranking	Moderate	Moderate	Moderate	Moderate

1. System Construction		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source? Yes=spring developed to collect water from beneath the ground; lower score No=water collected after it contacts the atmosphere or unknown; higher score	YES	0
Total System Construction Score		1

2. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	4	3	3	4
(Score = # Sources X 2) 8 Points Maximum		8	6	6	8
Sources of Class II or III leacheable contaminants or	YES	8	3	3	
4 Points Maximum		4	3	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Non-Irrigated Agricultural	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	11	11	10
Cumulative Potential Contaminant / Land Use Score		15	12	12	11
3. Final Susceptibility Source Score		13	11	11	13
4. Final Spring Ranking		Moderate	Moderate	Moderate	Moderate

1. System Construction		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source? Yes=spring developed to collect water from beneath the ground; lower score No=water collected after it contacts the atmosphere or unknown; higher score	YES	0
Total System Construction Score		1

2. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	4	3	3	4
(Score = # Sources X 2) 8 Points Maximum		8	6	6	8
Sources of Class II or III leacheable contaminants or	YES	8	3	3	
4 Points Maximum		4	3	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Non-Irrigated Agricultural	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	11	11	10
Cumulative Potential Contaminant / Land Use Score		15	12	12	11
3. Final Susceptibility Source Score		13	11	11	13
4. Final Spring Ranking		Moderate	Moderate	Moderate	Moderate

1. System Construction

		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source? Yes=spring developed to collect water from beneath the ground; lower score No=water collected after it contacts the atmosphere or unknown; higher score	YES	0
Total System Construction Score		1

2. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	YES	YES	YES	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	4	3	3	4
(Score = # Sources X 2) 8 Points Maximum		8	6	6	8
Sources of Class II or III leacheable contaminants or	YES	8	3	3	
4 Points Maximum		4	3	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Non-Irrigated Agricultural	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	11	11	10
Cumulative Potential Contaminant / Land Use Score		15	12	12	11
3. Final Susceptibility Source Score		13	11	11	13
4. Final Spring Ranking		High	High	High	High

1. System Construction

		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source? Yes=spring developed to collect water from beneath the ground; lower score No=water collected after it contacts the atmosphere or unknown; higher score	YES	0
Total System Construction Score		1

2. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	YES	YES	YES	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1

Potential Contaminant / Land Use - ZONE 1B

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant sources present (Number of Sources)	YES	4	3	3	4
(Score = # Sources X 2) 8 Points Maximum		8	6	6	8
Sources of Class II or III leacheable contaminants or	YES	8	3	3	
4 Points Maximum		4	3	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Non-Irrigated Agricultural	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	11	11	10
Cumulative Potential Contaminant / Land Use Score		15	12	12	11

3. Final Susceptibility Source Score

	IOC	VOC	SOC	Microbial
3. Final Susceptibility Source Score	13	11	11	13
4. Final Spring Ranking	High	High	High	High

1. System Construction

		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source? Yes=spring developed to collect water from beneath the ground; lower score No=water collected after it contacts the atmosphere or unknown; higher score	YES	0
Total System Construction Score		1

2. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1

Potential Contaminant / Land Use - ZONE 1B

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant sources present (Number of Sources)	YES	4	3	3	4
(Score = # Sources X 2) 8 Points Maximum		8	6	6	8
Sources of Class II or III leacheable contaminants or	YES	8	3	3	
4 Points Maximum		4	3	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Non-Irrigated Agricultural	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	11	11	10
Cumulative Potential Contaminant / Land Use Score		15	12	12	11

3. Final Susceptibility Source Score

	IOC	VOC	SOC	Microbial
3. Final Susceptibility Source Score	13	11	11	13
4. Final Spring Ranking	Moderate	Moderate	Moderate	Modaerate

1. System Construction

		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source? Yes=spring developed to collect water from beneath the ground; lower score No=water collected after it contacts the atmosphere or unknown; higher score	YES	0
Total System Construction Score		1

2. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1

Potential Contaminant / Land Use - ZONE 1B

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant sources present (Number of Sources)	YES	4	3	3	4
(Score = # Sources X 2) 8 Points Maximum		8	6	6	8
Sources of Class II or III leacheable contaminants or	YES	8	3	3	
4 Points Maximum		4	3	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Non-Irrigated Agricultural	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	11	11	10
Cumulative Potential Contaminant / Land Use Score		15	12	12	11

3. Final Susceptibility Source Score

	IOC	VOC	SOC	Microbial
3. Final Susceptibility Source Score	13	11	11	13
4. Final Spring Ranking	Moderate	Moderate	Moderate	Moderate

1. System Construction		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source? Yes=spring developed to collect water from beneath the ground; lower score No=water collected after it contacts the atmosphere or unknown; higher score	YES	0
Total System Construction Score		1

2. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	4	3	3	4
(Score = # Sources X 2) 8 Points Maximum		8	6	6	8
Sources of Class II or III leacheable contaminants or	YES	8	3	3	
4 Points Maximum		4	3	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Non-Irrigated Agricultural	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	11	11	10
Cumulative Potential Contaminant / Land Use Score		15	12	12	11
3. Final Susceptibility Source Score		13	11	11	13
4. Final Spring Ranking		Moderate	Moderate	Moderate	Moderate

1. System Construction		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source? Yes=spring developed to collect water from beneath the ground; lower score No=water collected after it contacts the atmosphere or unknown; higher score	YES	0
Total System Construction Score		1

2. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	4	3	3	4
(Score = # Sources X 2) 8 Points Maximum		8	6	6	8
Sources of Class II or III leacheable contaminants or	YES	8	3	3	
4 Points Maximum		4	3	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Non-Irrigated Agricultural	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	11	11	10
Cumulative Potential Contaminant / Land Use Score		15	12	12	11
3. Final Susceptibility Source Score		13	11	11	13
4. Final Spring Ranking		Moderate	Moderate	Moderate	Moderate

1. System Construction		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source? Yes=spring developed to collect water from beneath the ground; lower score No=water collected after it contacts the atmosphere or unknown; higher score	YES	0
Total System Construction Score		1

2. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	4	3	3	4
(Score = # Sources X 2) 8 Points Maximum		8	6	6	8
Sources of Class II or III leacheable contaminants or	YES	8	3	3	
4 Points Maximum		4	3	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Non-Irrigated Agricultural	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	11	11	10
Cumulative Potential Contaminant / Land Use Score		15	12	12	11
3. Final Susceptibility Source Score		13	11	11	13
4. Final Spring Ranking		Moderate	Moderate	Moderate	Moderate

1. System Construction		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source? Yes=spring developed to collect water from beneath the ground; lower score No=water collected after it contacts the atmosphere or unknown; higher score	YES	0
Total System Construction Score		1

2. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	4	3	3	4
(Score = # Sources X 2) 8 Points Maximum		8	6	6	8
Sources of Class II or III leacheable contaminants or	YES	8	3	3	
4 Points Maximum		4	3	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Non-Irrigated Agricultural	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	11	11	10
Cumulative Potential Contaminant / Land Use Score		15	12	12	11
4. Final Susceptibility Source Score		13	11	11	13
5. Final Spring Ranking		Moderate	Moderate	Moderate	Moderate